POSSIBLE ADAPTIVE SIGNIFICANCE OF "TAIL" STRUCTURE IN "FALSE HEAD" LYCAENID BUTTERFLIES

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Robbins (1980, 1981), in his papers on the "False Head" hypothesis of Lycaenid butterflies, argues that the false head on the hindwings of some species (i.e. especially *Arawacus aetolus* Sulzer, Fig. 1) provides survival advantages against predator attack. It is also said (cf. Cott, 1940; Robbins, 1980) that movement of the hindwings in the vertical plane when such insects are at rest enhances the false head deception by making the "tails" appear similar to moving antennae. In this short paper we suggest that movement of the false antennae in *A. aetolus* occurs more by virtue of their shape than through movement of the hindwings. Hindwing movement may be associated with other biological functions e.g. scent scattering (cf. Robbins, 1980).

Whilst setting a specimen of *A. aetolus* recently caught in eastern Venezuela we noticed that heat rising from the hand when the dead insect was held between thumb and forefinger caused life-like

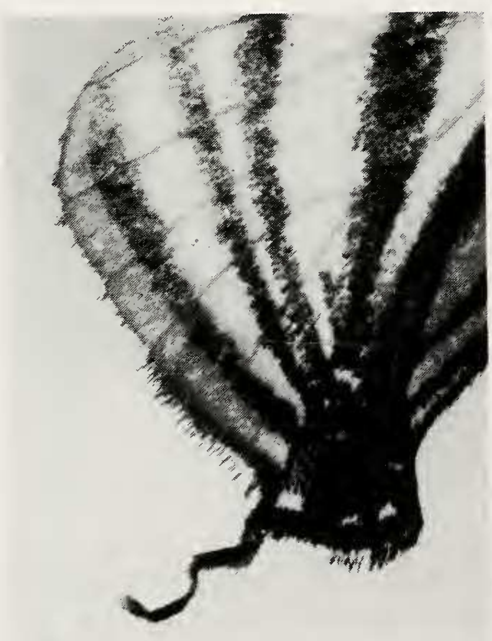

Fig. 1 left-hand underside of female *Arawacus aetolus* Sulz. showing false head. Guyana Trail, east Venezuela (x 5.6).

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movement of the false antennae. This movement was very similar to that observed in the field. Close examination showed that each "tail" is twisted along its length like an aeroplane propellor (Fig. 2). This twist can clearly be seen in the photograph of a living *aetolus* shown in Robbins' 1980 paper (his Fig. 1). In Robbins' 1981 article where a drawing of *aetolus* accompanies the text (his Fig. 1) the "tails" are illustrated as being straight. This is probably erroneous as it appears to be the same individual as that photographed for the 1980 paper.

To demonstrate the effectiveness of this configuration we made models of three types of "tail" from fine paper (Fig. 3). These were held over a small heat source and the results observed. Model A showed only slight movement from side to side which, when viewed laterally by a potential predator, would not give the impression of moving antennae. In contrast, models B & C showed much vertical movement which would give the impression of twitching antennae when viewed from the side.

The models which presented a flat surface to the rising warm air resulted in the most antenna-like movement. If the butterfly relied only on convected warm air for this (as may be the case; the butterfly frequently rests on sun-warmed tropical foliage) either model B or C would provide the necessary configuration. However, if the configuration were to respond to horizontal breezes as well it would have to incorporate both vertical and horizontal surfaces. Model C satisfies these requirements. Model C also has the advantage of giving the more irregular, circular movements associated with real antennae. In nature, model B would be impossible to achieve without twisting from the vertical axis. Twisting of this sort would then result in structures of the model C design.

Based on this evidence, we suggest that the twisting of the tails in *A. aetolus* is an adaptive mechanism evolved specificially to utilise air currents for the purpose of imitating antennal movement, thus accentuating the false head deception.

References

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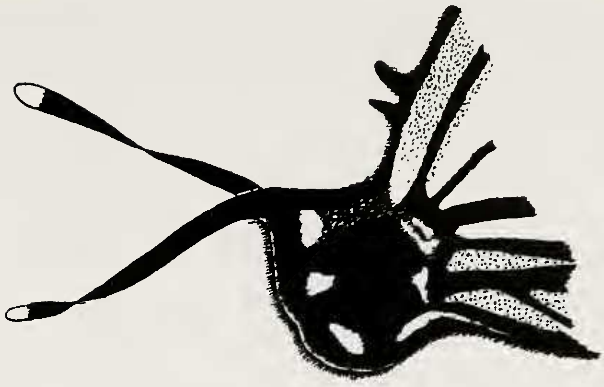

Fig. 2 Diagrammatic representation of *A aetolus* hingwing showing twist in "tails" (enlarged).

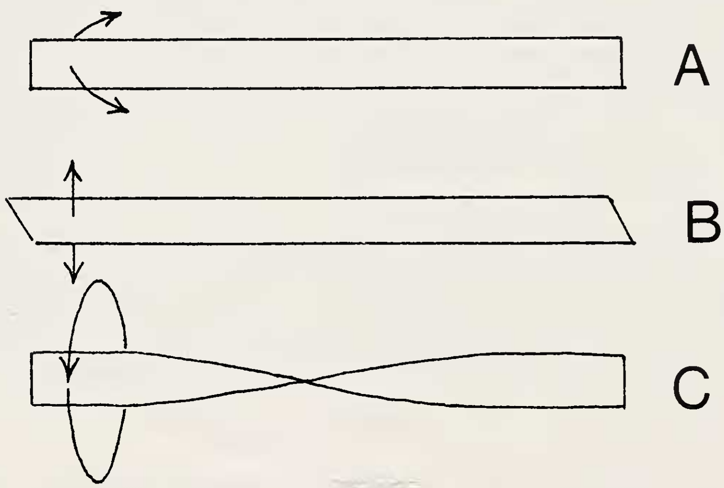

Fig. 3 The three types of model used to demonstrate movement caused by convected air. Direction of movement is shown by arrows.

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